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SMART SURVEILLANCE SYSTEM USING MACHINE LEARNING

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ABSTRACT

In today's world, where everyone wants to keep their valuables safe and secure, video surveillance for observing a particular area has become the need of the hour. To address this problem, we have come up with a solution of smart surveillance system for certain places like bank vaults, homes where the human presence is not available. At such places, it is not worth to continuously monitor the area with the cameras. This wastes the power consumption as well as the storage required for the footages. Our system will detect human presence using opencv which is based on machine learning along with python and send the alert to the telegram bot.

Keywords: Surveillance, Monitor, Footage, Python, Telegram Bot.

I. INTRODUCTION

As recently as 10 years ago, consumers did not have access to technology that let them manage their own home security systems. Smart surveillance systems changed that. Originally, traditional security systems were hardwired into the home and monitored by a central station, usually a home alarm company. The customer paid monthly fees.

Fast forward and today, consumers have smartphones, home networks and wireless technology—all of which the smart surveillance system can utilize. People can buy door smart cctv to detect if someone is outside or door locks that can be monitored and potentially controlled from one's cell phone and sending alerts to Telegram.

In essence, smart alarm systems may be able to empower the customer to build their own network of security while retaining control, usually through their cell phones.

II. PROBLEM STATEMENT

It is necessary to make use of automatic video analysis technologies for developing smart surveillance system which can aid the human operator in both detecting and reacting to potential threats. The internet and wireless broadband infrastructure is becoming robust enough to permit excellent remote video surveillance. With advances in hardware and software technology, and the emergence of ubiquitous internet infrastructure and wireless networks with broadband capability, it is now possible to design and build a networked video surveillance system that can do an excellent job of remote video supervision from anywhere and at any time and sending alerts.

III. METHODOLOGY

The implementation phase of the project is where the detailed design is actually transformed into working code. Aim of the phase is to translate the design into a best possible solution in a suitable programming language. This chapter covers the implementation aspects of the project, giving details of the programming language and development environment used. It also gives an overview of the core modules of the project with their step by step flow. The implementation stage requires the following tasks:

- Careful planning.
- Investigation of system and constraints.
- Design of methods to achieve the changeover.
- Evaluation of the changeover method.
- Correct decisions regarding selection of the platform.

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• Appropriate selection of the language for application development.

OpenCv

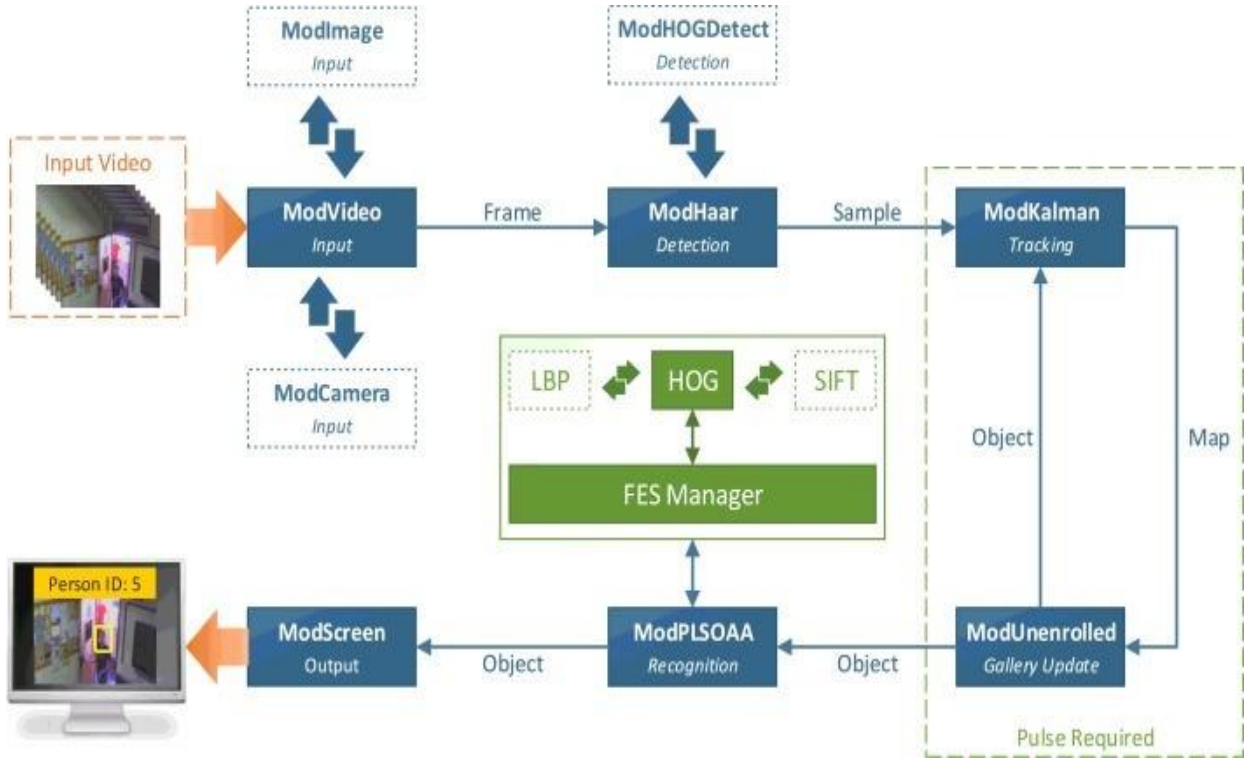
Open Source Computer Vision Library is commonly referred to as OpenCV. This is a library of methods of programming and focuses mainly on Intel's real-time machine vision. The library is a cross-platform library targeted primarily at image processing in real time. This C interface makes OpenCV portable for certain different platforms, such as digital signal processors.

Face Detection

Face Detection is displayed while using integrated software and by analysis of Machine learning algorithm and the whole necessary process is continued on by OpenCv and Python packages.

IV. MACHINE LEARNING ALGORITHM

The algorithm used for face detection is Haar like feature cascade classifier. Haar-like features are digital image features used in object recognition. They owe their name to their intuitive similarity with Haar wavelets and were used in the first real-time face detector. Viola and Jones adapted the idea of using Haar wavelets and developed the so-called Haar-like features. A Haar-like feature considers adjacent rectangular regions at a specific location in a detection window, sums up the pixel intensities in each region and calculates the difference between these sums. This difference is then used to categorize sub-sections of an image. Therefore a common haar feature for face detection is a set of two adjacent rectangles that lie above the eye and the cheek region. The position of these rectangles is defined relative to a detection window that acts like a bounding box to the target face.



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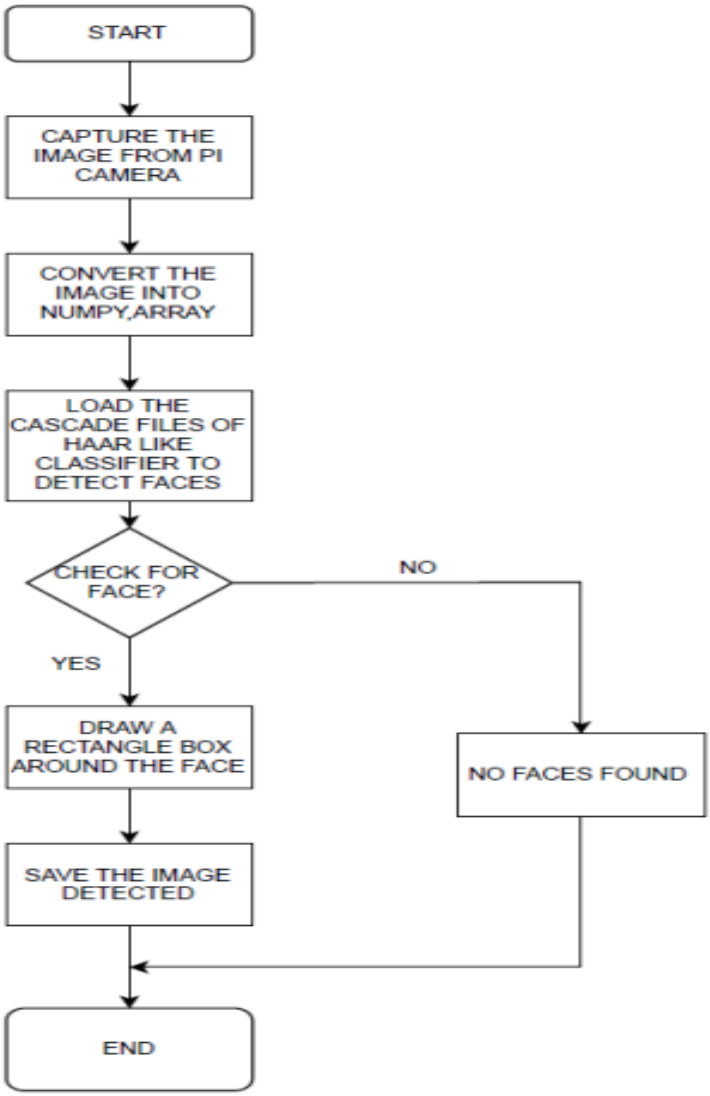
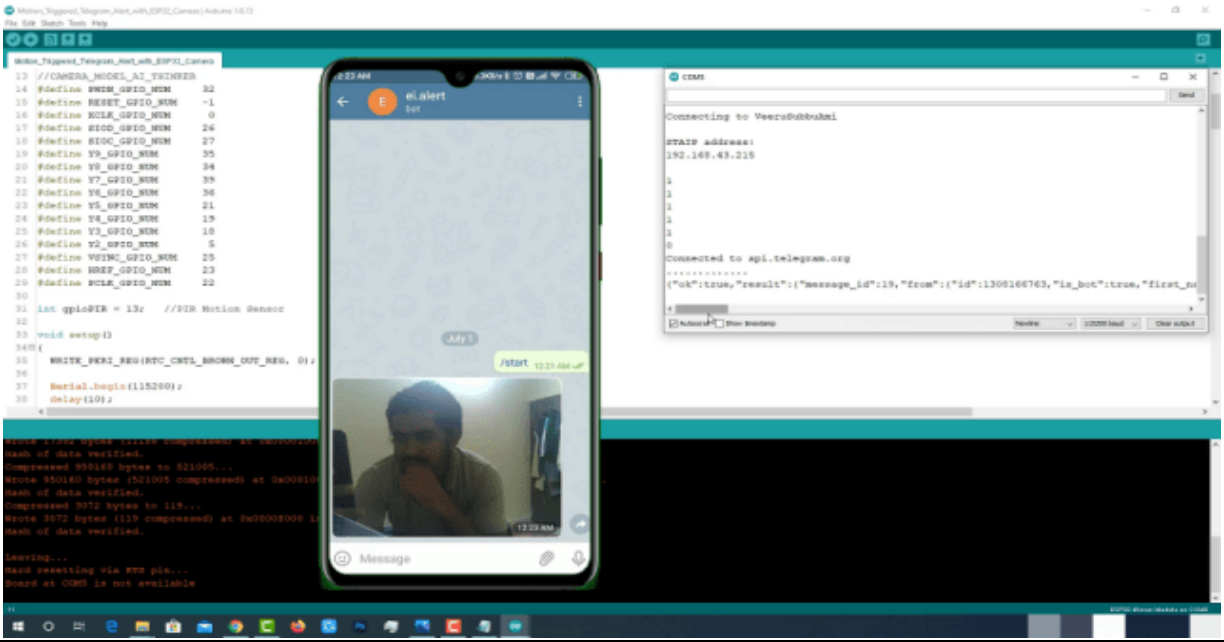


Fig 1: Haar like feature cascade classification

V. OUTPUT



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VI. CONCLUSION

Thus, we have developed a smart surveillance camera that can be started using alexa and is capable of providing face detection a. Also the camera system is compact and can be implemented with low cost. The implemented face detection algorithm (Haar like cascade classifier) is very effective, with an accuracy of 88.9 percent which can be increased further by effectively improving the illumination of the area.

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